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SECTION 640

Vegetated or Rock Bioswales

640.1 DESCRIPTION

Work under this item includes the installation of vegetated and/or rock bioswales and associated appurtenances. Except as herein stated, the requirements specified for MAG Specifications 201, 215, 220, 425, 430, and 796 are applicable to this specification.

640.2 MATERIALS

See MAG Specifications 201, 215, 220, 425, 430, and 796.

640.3 CONSTRUCTION METHODS

640.3.1 Temporary Erosion Control

Install all temporary erosion control measures prior to site disturbance. Install storm drain inlet protection to prevent clogging of the storm drains and increases in sediment loads to downstream stormwater facilities or waterbodies. Inspect erosion control measures at least once a week and after each rainfall event. Make any required repairs immediately. Erosion control devices shall be maintained until the site is stabilized, as determined by the Engineer. If sediment is introduced into the swale during or immediately following excavation, the sediment will need to be removed from the vegetated bioswale or underdrain prior to initiating the next step in the construction process.

640.3.2 Swale Excavation, Backfilling, and Grading

Refer to MAG Specification Section 215 – Earthwork for Open Channels, except as follows: If the vegetated bioswale is used for runoff conveyance during construction, initial grading of the swale shall be performed in conjunction with rough grading of the site. Once construction in the contributing drainage area has been completed and the site is stabilized, re-grade and restore the bioswale to ensure functionality.
If an alternative temporary sediment basin facility is being provided before discharge to the bioswale, grading and construction of the vegetated bioswale should not be connected until the contributing drainage area has been completed and stabilized. If an underdrain is required per the construction documents excavate the underdrain to the specified depth (elevation) and follow Specification 622. Typical details would be required when connected to a downstream drainage facility. All subgrade material below the specified elevation shall be left undisturbed, unless otherwise directed by the Engineer. Materials should be graded and contoured onsite when possible or excavated from the vegetated swale shall be disposed of on-site at locations (temporary stockpile areas) designated by the Engineer. The perforated pipe (underdrain) shall be laid directly on the gravel bed. Grade and alignment shall not vary from the prescribed grade by more than 0.1 foot at any point. The joints between sections of pipe shall be connected in a fashion acceptable to Engineer. Once the pipe is in place, it shall be covered immediately with open-graded stone material as specified in the construction documents. The material shall be of uniform depth on either side of the pipe. Special inlets and special devices at the outlet end of the pipe shall be constructed as shown in the plans.

640.3.3 Check Dams

Refer to Specification 644 for check dam construction. Maximum spacing between check dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam. The maximum height of the dam should not exceed 2 feet.

640.3.4 Construction Sequence Scheduling

An implementation schedule should be included as part of the erosion control plan to identify the order of operations for construction activities. This is particularly important when constructing stormwater BMPs that are designed to infiltrate stormwater runoff. There are many construction activities which may contribute to the failure of a stormwater BMP if they are not planned for accordingly. The following items should be considered in developing an implementation schedule for a project:

A. Perform continuous inspection of temporary construction access to ensure that it is providing adequate erosion and sedimentation control for the construction site.

B. Install erosion protection along the perimeter of the site to prevent sediment from leaving the site during the construction process. Protection should be installed at a uniform elevation and constructed so that flow cannot bypass the ends.

C. All down-gradient perimeter sediment-control BMPs (e.g. temporary outlet controls) must be in place before any up-gradient land-disturbing activity begins.

D. Rough grade the site leaving the vegetated bioswale area undisturbed until the contributing drainage area has been completed and the site is stabilized.

E. Construct the road/site improvements in a manner that minimizes adverse impacts to the location and function of the stormwater BMPs. For example, ensure that construction access or equipment staging areas do not conflict with the final location of the vegetated swale.

F. Perform all other site improvements in a manner that minimizes adverse impacts to the location and function of the stormwater BMPs.

G. Install any required erosion control blanket, ditch checks, and other semi-permanent and permanent erosion control measures.

H. Stabilize the site by implementing the landscaping plan.

I. Remove the temporary erosion and sediment controls after the swale is stabilized per the Engineer's approval. It is important for the bioswale to be stabilized before receiving stormwater flow.

640.4 MEASUREMENT AND PAYMENT

The unit of measure for vegetated or rock bioswales will be linear feet. The payment will be in accordance with the following MAG Specification Sections, including all labor, materials, tools, equipment and incidentals needed to complete work specified. Section 201 – Clearing and Grubbing Section 215 – Earthwork for Open Channels Section 220 – Riprap Construction Section 430 – Landscaping and Planting Section 796 – Geosynthetics

- End of Section -

SECTION 644

Check Dams for Low Impact Development Facilities

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644.1 DESCRIPTION

Work under this item includes the installation of check dams to slow and hold water flow in LID facilities. Except as herein stated, the requirements specified for MAG Specifications 201, 211, 215, 220, and 301 are applicable to this specification.

644.2 MATERIALS

The stone shall meet the requirements set forth in the design plans or modified in the special provisions.

644.3 GENERAL

644.3.1 Construction Requirements:

Stone Check Dam:
Construct the check dam with washed angular rock with D50 of 3 inches minimum (or approved equal) with side slopes of 3 to 1. Modification to this layout need to be approved by the Design Engineer. Place the stone so that it completely covers the width of the area and sides per the detail on the drawings. Form the overflow notch so that top of the outlet crest is approximately 4 inches lower than the outer edges.
Maximum spacing between check dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam. The maximum height of the dam should not exceed 2 feet. Mechanical placement required to achieve complete coverage of swale and to ensure that center of dam is lower than edges.

644.4 MEASURE AND PAYMENT

The unit of measure and payment for stone check dam will be made per cubic yard and include installation, setting, and leveling of stone and all labor, materials, tools, equipment and incidentals needed to complete the work specified.

- End of Section -